Understanding Movement

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ABSTRACT
Through abstract movement, we are able to communicate various emotional content to users on the computer screen. This article examines movement in Theatre and Psychology and how connotative values are associated with movement. Through understanding the characteristics of movement and their various effects, the designer may better understand the complexity and relationship between movement and emotion.

Keywords
Movement, animation, emotion, affordance, theatre

INTRODUCTION
By understanding the ability and strength of movement to convey emotions, we are able to enhance the users experience and understanding of information displayed on the computer screen. If we do not understand the communicative value of movement, we can be sending mixed messages. There are countless web pages on the World Wide Web which use excessive animation. This animation may create a disturbing environment for the user, unbeknownst to the designer. By understanding how patterns of movement convey emotion, designers can better utilize animation to enhance, not harm, their information.

UNDERSTANDING MOVEMENT: THE STAGE
In my research, I wanted to understand the characteristics of movement and how they are associated with emotion. For years, in theatre and dance, people have been using movement to enhance the emotional content of their characters and stories. Movement communicates to the audience whether or not they should like a character, or whether the story is a tragedy or comedy. These gestures can be very culturally-based. In ballet, movement is closely associated with the Greco-Roman ideals of posture and movement. Erect, open posture and slow, expansive gestures are seen as beautiful, while narrow, cramped and jerky movements are seen as ugly [1]. Though these methods are very culturally-based and often specific to human movement, they are a good starting point to understand our emotional associations with movement within western culture.

In a play, the director looks at the combined movement of the cast and treats movement as an extension of line, mass and form. The arrangements of these create a mood or arouse an emotional response in the audience [2]. The lines created by paths of movement provoke a variety of emotions. For example, an actor walking in a horizontal direction on the stage may convey stability, heaviness, or relaxation. The line, when straight can convey formality and strength, while curved line can convey naturalness and warmth.

The shear mass of the characters on stage can create an emotional situation. In Gestalt theory, images that move together are associated together. When a crowd on stage moves together in the same direction it can show power and determination; when the crowd is wandering apart, no longer associated together, they are weak and disoriented. The form created by paths of movement can be symmetrical, showing formality, artificiality, coldness or it can be irregular, expressing naturalness or informality. The director must work with all of the factors to convey a desired emotion.

As the director is working with the actors on stage, it is very important to choreograph the movement. The audience often will have their attention guided to the main characters in various scenes by the hierarchy and use of movement. Depending on the context, the movement of the non-central characters should bow down to, not overtake, the central characters in a scene.

The actors themselves must keep in mind the amount of movement in a gesture and the amount of space covered whether they are conveying power or weakness on stage. The length of the movement, whether long or short, may enhance the desired emotion. The intensity of a movement, such as a fist hitting a table will add to the emotional content. Motion is an important cue toward understanding the character. The wrong movements can ruin a character or even the whole dynamic of the stage.

THE AFFORDANCE OF MOVEMENT
In psychology, movement has also been associated with communication, as with the theory of affordances. J. J. Gibson introduced to us the idea of "affordances." This idea surrounds that inherent to the properties of an object or material is information about that object or material. In his book, *An Ecological Approach to Visual Perception,* he wrote that "...the composition and layout of surfaces constitute what they afford. If so, to perceive them is to perceive what they afford. This is a radical hypothesis, for it implies that the 'values' and

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'meanings' of things in the environment can be directly perceived."[3].

When we look at the world around us, the way an animal or person moves communicates to us a great deal of information. A butterfly's movement may afford chasing, where a spider's may afford avoidance. We are able to recognize the creature by just the movement alone and from pattern of movement we are able to interpret the "meaning" of the creature.

MOVEMENT AND ABSTRACT OBJECTS

Looking at movement alone absent of any context, we may project human emotions or motivations upon the object based upon the movement. We are very self-centered and see ourselves in almost anything. "We assign identities and emotions where none exist. And we make the world over in our image." [5] We are able to see ourselves in two dots and a line, and this can be full of emotional content! When the detail comes off of an object, such as a photo-realistic face vs. our two dots and lines, we are able to see ourselves in the object, projecting emotions and various qualities. As one pulls away the veneer of an object, the movement becomes more prominent and the affordance of emotion is evident.

In removing the identity of an object, Rudolf Arnheim in *Art and Visual Perception* wrote about visible motor forces and the use of abstract animation to communicate physical causality and relationships between simple square blocks.[6] He focused on dialogs between the abstract shapes through movement and was able to find that people projected human emotions and values on the objects.

Further, Arnheim observed that the more complex the behavior, the more human qualities were associated with the movement. What attributed to the complexity was the association of "organic" movement. Animations which feature more mechanical movements were prone to demonstrate less emotion than organic movements.

CHARACTERISTICS OF MOVEMENT

Movement of the human body is very different than the movement of objects on the computer screen. In order to bring over the information gathered in research from the performing arts to the computer, the minimum characteristics of movement on the computer screen were broken down. Through a number of animation studies, I found them to be: **Path** (the line the object movement creates), **Area** (the use of space by the object), **Direction** (the direction of the animation), **Speed** (the speed and tempo of the animated object).

As found in background research and in early trials, complex patterns of movement tended to produce more connotative meanings. This hypothesis was tested by using combinations of different characteristics in several animations to be viewed by subjects.

These animations were viewed in a random order and evaluated on their connotative value by 27 student volunteers using a semantic differential. In order to evaluate the patterns of movement, 7 animations were created using only a dot, the first of which was a "dummy" animation so that they can become acquainted with the interface and the evaluation method. It was found that a number of combinations of characteristics brought about emotional responses. The findings also revealed organic movement conveyed more emotion than geometric and the more complex the patterns the stronger the emotional responses. [6]

APPLICATIONS IN INTERFACE DESIGN

By understanding how movement patterns communicate connotative information, we are able to combine characteristics to movement patterns that suit our needs. For instance, in alert boxes, we can introduce a pattern to communicate information about the message. As we know, people don't always read alert messages, and by introducing a simple animation, we can communicate to the user quickly and efficiently how severe the situation is. A simple, organic pattern may convey a mild problem, where an mechanical, fast, irregular movement can show cause for alarm.

Almost daily new technology for introducing animation on the World Wide Web appears. As designers approach these, they should be aware of the messages they are sending out to the user. The bells and whistles are very tempting to incorporate into the design, but the motion may be introducing various comfort levels that the designer should be aware of. Advertisers are especially guilty of creating chaotic and uncomfortable environments for people as they fight for attention on web pages with conflicting animation. Movement is extremely powerful in gaining our attention and communicating to us various information, and when this is abused or misunderstood, an uncomfortable environment results.

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